BLIND DECODING

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation of, and claims the benefit under 35 U.S.C. §365(c), of PCT application PCT/EP2012/054669, filed on Mar. 16, 2012, the disclosure of which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] This invention relates generally to wireless networks and, more specifically, relates to downlink control information in wireless networks.

BACKGROUND

[0003] This section is intended to provide a background or context to the invention disclosed below. The description herein may include concepts that could be pursued, but are not necessarily ones that have been previously conceived, implemented or described. Therefore, unless otherwise explicitly indicated herein, what is described in this section is not prior art to the description in this application and is not admitted to be prior art by inclusion in this section.

[0004] Radio communication systems typically involve the transmission of downlink control information via radio resources whose precise identity is not known to the intended recipient(s) of the downlink control information. A receiving device finds downlink control information intended for it by repeatedly selecting different candidate sets of radio resources and attempting to successfully decode the signals carried on said sets of radio resources. This is known as blind decoding.

[0005] It has been proposed to make such unscheduled transmissions of downlink control information according to an enhanced transmission technique by which gains, such as frequency-domain packet scheduling (FDPS) gain, can be targeted; whilst continuing to also make unscheduled transmissions according to the conventional transmission technique.

[0006] There has been identified the challenge of reducing the processing power required by a communication device to perform blind decoding under the above-mentioned proposal.

SUMMARY

[0007] This section contains examples of possible implementations and is not meant to be limiting.

[0008] There is hereby provided a method, comprising: in a system in which a communication device searches for unscheduled transmissions of downlink control information for said communication device: selecting a combination of search spaces for unscheduled transmissions of downlink control information for a communication device by a plurality of transmission techniques: and transmitting an indication of the result of the selected combination to said communication device.

[0009] According to one embodiment, the method further comprises deciding how much search space to assign to unscheduled transmissions of downlink control information for said communication device by one or more of said plurality of transmission techniques relative to unscheduled transmissions of downlink control information for said communication device by one or more others of said plurality of transmission techniques.

[0010] According to one embodiment, said selecting comprises selecting a predefined combination from a plurality of predefined combinations.

[0011] According to one embodiment, said plurality of predefined combinations includes a predefined combination according to which no search space is assigned to unscheduled transmissions of downlink control information by one of said plurality of transmission techniques.

[0012] According to one embodiment, a plurality of aggregation levels are used for the transmission of downlink control information, and a respective search space is predefined for each aggregation level for each transmission technique; and the method further comprises: selecting a respective set of one or more aggregation levels for each of said plurality of transmission techniques; and transmitting an indication of the selected respective sets of aggregation levels to said communication device.

[0013] According to one embodiment, said selecting is performed at least partly on the basis of one or more of: (a) the size of the load on the cell in which the transmissions are made, and (b) channel state information for the wireless interface with the communication device.

[0014] There is also hereby provided a method, comprising: in a system in which a communication device searches for unscheduled transmissions of downlink control information messages for said communication device according to a plurality of message formats: selecting a respective set of one or more search spaces for each of said plurality of message formats; and transmitting to said communication device an indication of the result of said selection of respective sets of one or more search spaces.

[0015] According to one embodiment, a plurality of aggregation levels are used for the transmission of downlink control messages, and a respective search space is predefined for each aggregation level; and the method further comprises: selecting a respective set of one or more aggregation levels for each of said plurality of message formats; and transmitting an indication of the selected respective sets of aggregation levels to said communication device.

[0016] According to one embodiment, the plurality of message formats includes first and second message formats providing control information for a transmission according to respective first and second transmission modes; and the selecting takes into account an indication of the respective transmission error probability for the first and second transmission modes.

[0017] There is also hereby provided a method, comprising: in a system in which a radio access network transmits indications of the results of selections of combinations of search spaces for unscheduled transmissions by a plurality of transmission techniques of downlink control information for one or more communication devices: searching at a first communication device for unscheduled transmissions of downlink control information for said communication device; wherein said searching is performed either: (a) on the basis of a transmitted indication of the result of a selection for said first communication device of a combination of search spaces for unscheduled transmissions by said plurality of transmission techniques of downlink control information; or (b) in the absence of a transmitted indication of the result of a selection for said first communication device of a combination of